# ARUBA

# CLIMATOLOGICAL SUMMARY 2017

## PRECIPITATION

The total amount of rainfall recorded at Reina Beatrix International Airport for the year 2017 was **391.0** mm. This is **17.1 %** below normal ( Figure 1 ).

During the first quarter of the year 2017 ( January, February, March ) a total of **144.4** mm of rainfall was recorded. This is **36.9 %** of the total amount for 2017.

During the second quarter of the year 2017 ( April, May, June ) a total of **36.8** mm of rainfall was recorded. This is **9.4 %**of the total amount for 2017.

During the third quarter of the year 2017 ( July, August, September ) a total of **72.2** mm of rainfall was recorded. This is **18.5 %** of the total amount for 2017.

During the fourth quarter of the year 2017 ( October, November, December ) a total of **137.6** mm of rainfall was recorded. This is **35.2 %** of the total amount for 2017.

The first quarter of the year 2017 which is part of the rainy season was the *wettest* quarter, and the total amount of rain for that quarter was above normal values.

The *wettest* month for 2017 was January with a total of **110.8** mm which was above normal values for that month. The *driest* month for 2017 was April with a total of **0.0** mm which is below normal for that month.

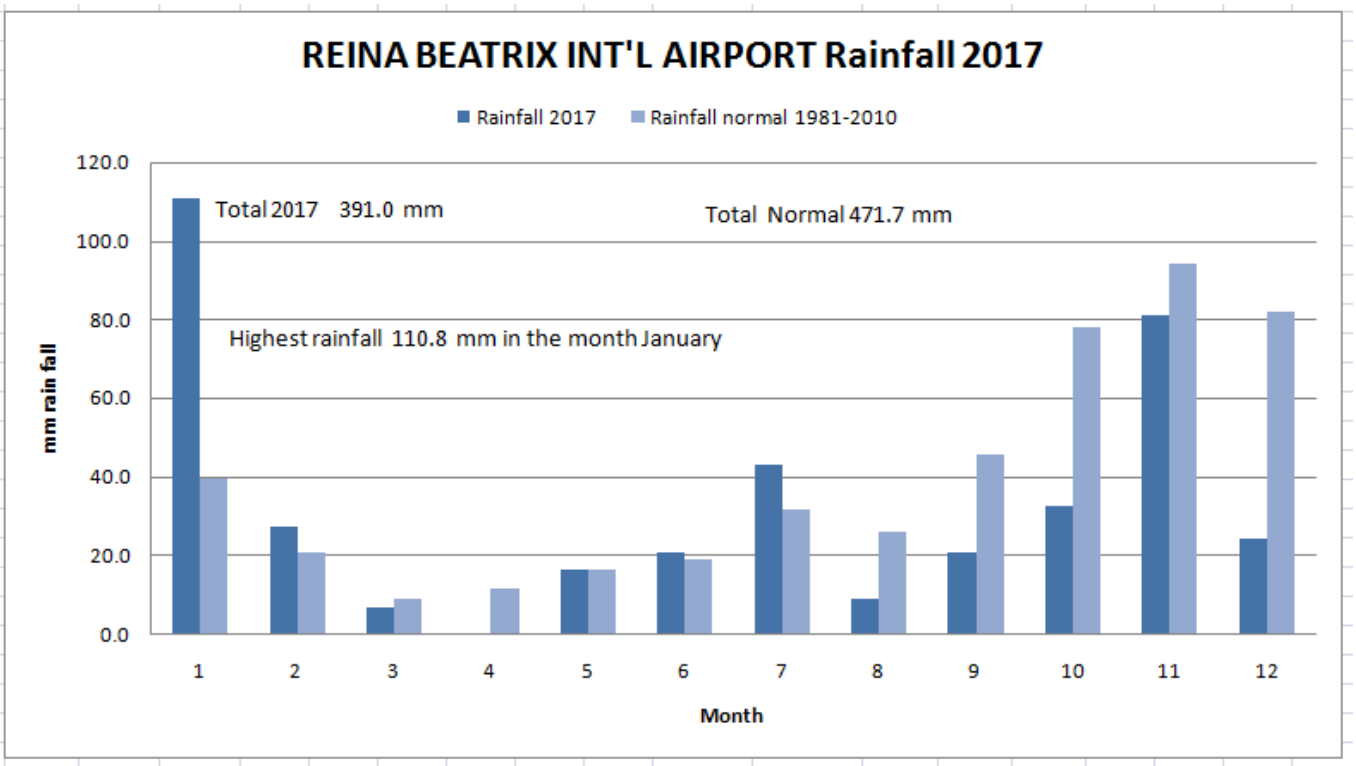


**Figure 1. Rainfall 2017 versus 30 year normal (1981-2010) in mm.**

**TEMPERATURE**

The year average air temperature recorded at the Reina Beatrix International Airport Aruba for 2017 was **28.6** ºC (normal value **28.1** ºC), which is a tab above normal. (Figure 2a).

The *warmest* month of 2017 were September with an average of **30.1** ºC and the *coldest* month of 2017 was January with an average of **26.5** ºC.

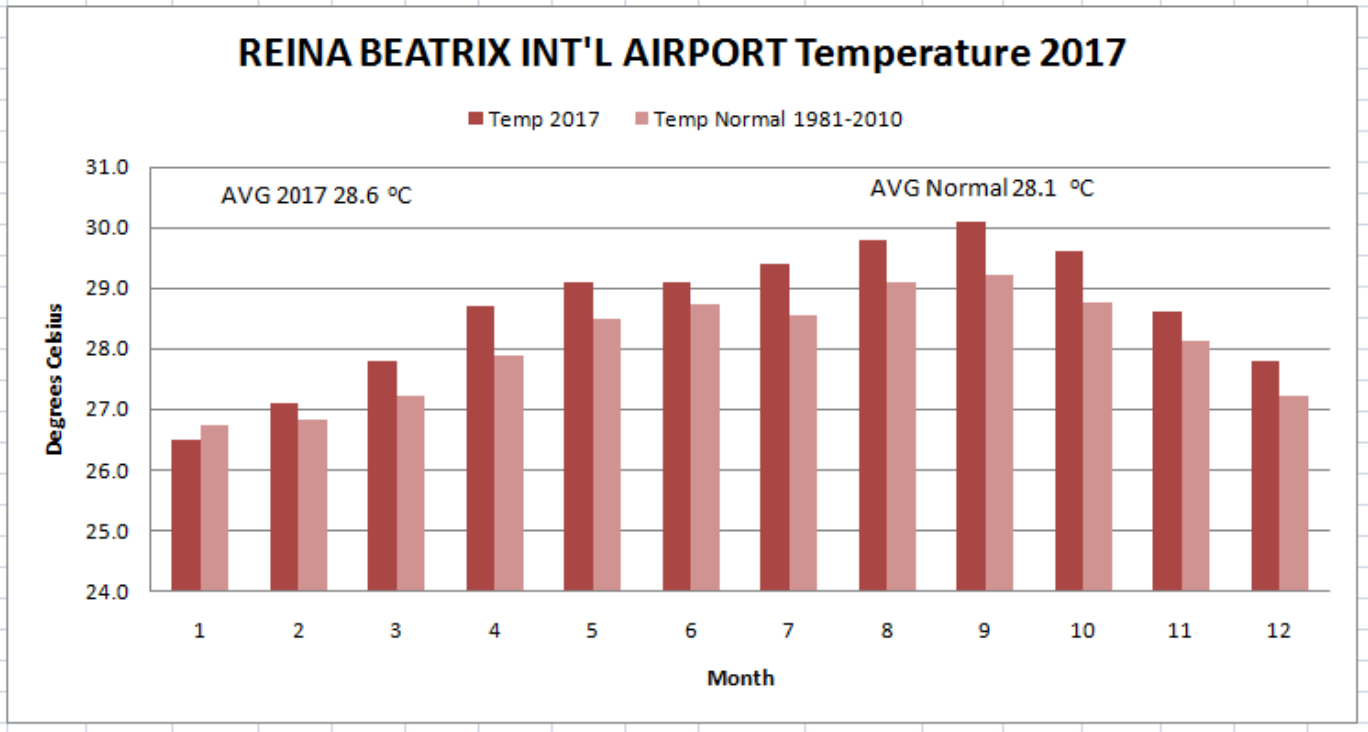


**Figure 2a. Temperatures in degrees Celsius 2017.**

The average maximum temperature for the year 2017 was **32.1** ºC compared with the normal average maximum temperature **31.5** ºC which is just a tab above normal. (Figure 2b).

The *absolute* maximum temperature was in August 2017 with **35.2** ºC and the *absolute* minimum temperature recorded was **21.8** ºC in January and February 2017.

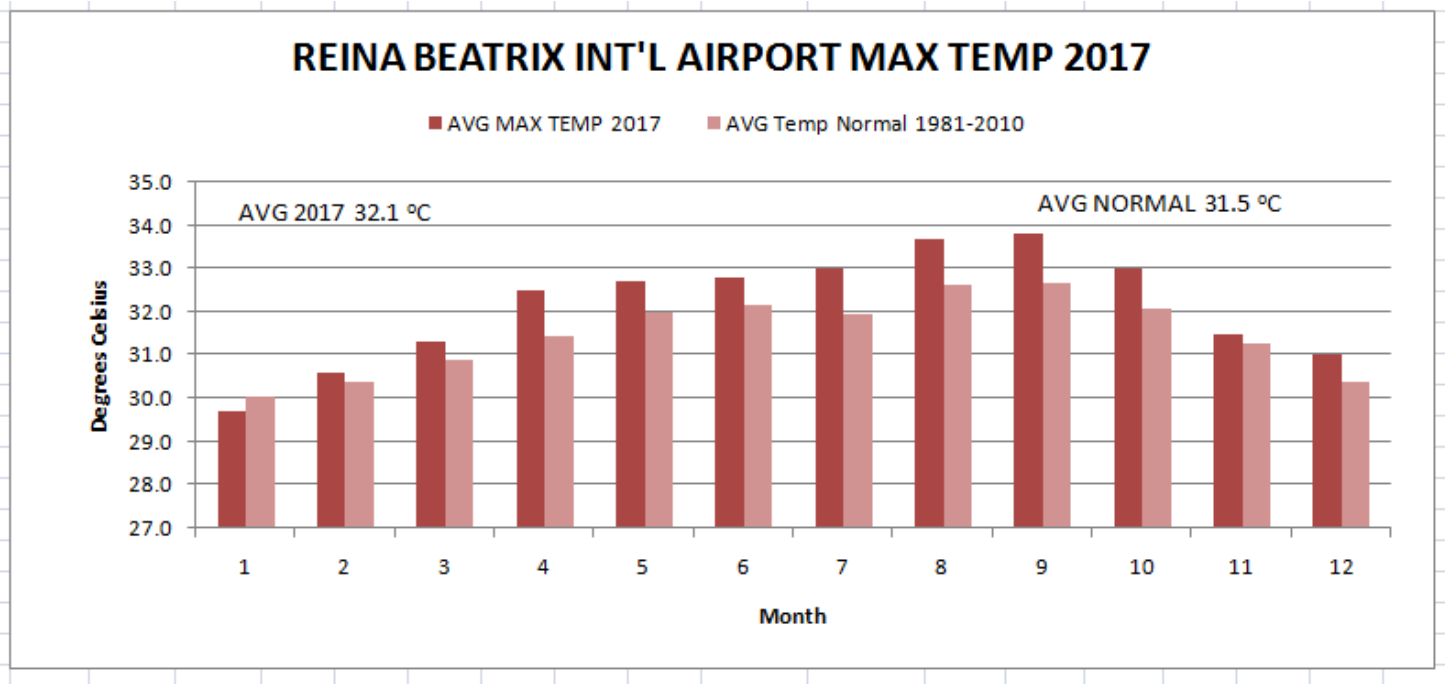


**Figure 2b. Maximum temperatures in degrees Celsius 2017.**

**WINDSPEED**

The year average wind-speed at 10 meters height for the year 2017 at the Reina Beatrix International Airport was **7.0 m**/sec (25.2 km/h) compared with the normal value of **7.3** m/sec (26.3 km/h) is just below normal.(Figure 3a).

The *highest* average wind-speed of **8.5** m/sec (30.6 km/h) was recorded during the month of June 2017. The *lowest* average wind-speed during the month of September 2017 with a **5.4** m/sec (19.4 km/h).

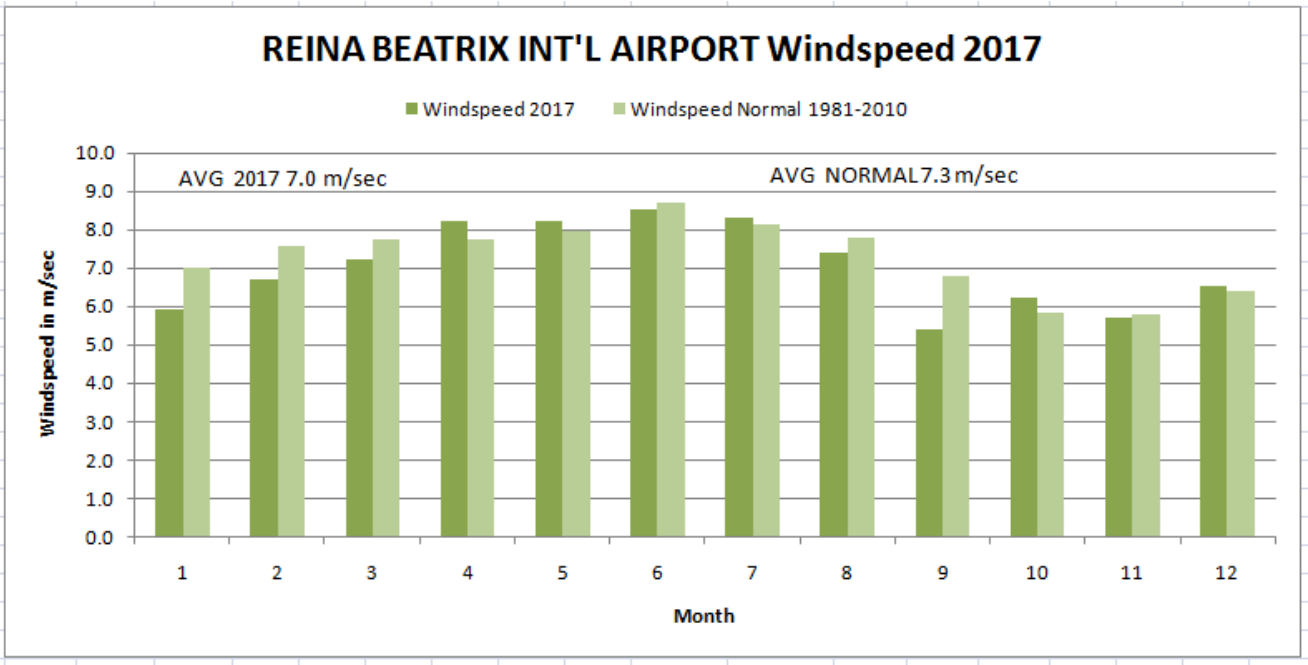


**Figure 3a. Wind-speed 2017 in m/sec.**

The average maximum wind-speed for the year 2017 was **14.5** m/sec (52.2 km/h) ,compared to the normal value of **14.5** m/sec (52.2 km/h), which is around normal. (Figure 3b).

The *absolute* maximum wind-speed of **21.1** m/sec (76.0 km/h) was recorded during the month of October 2017.

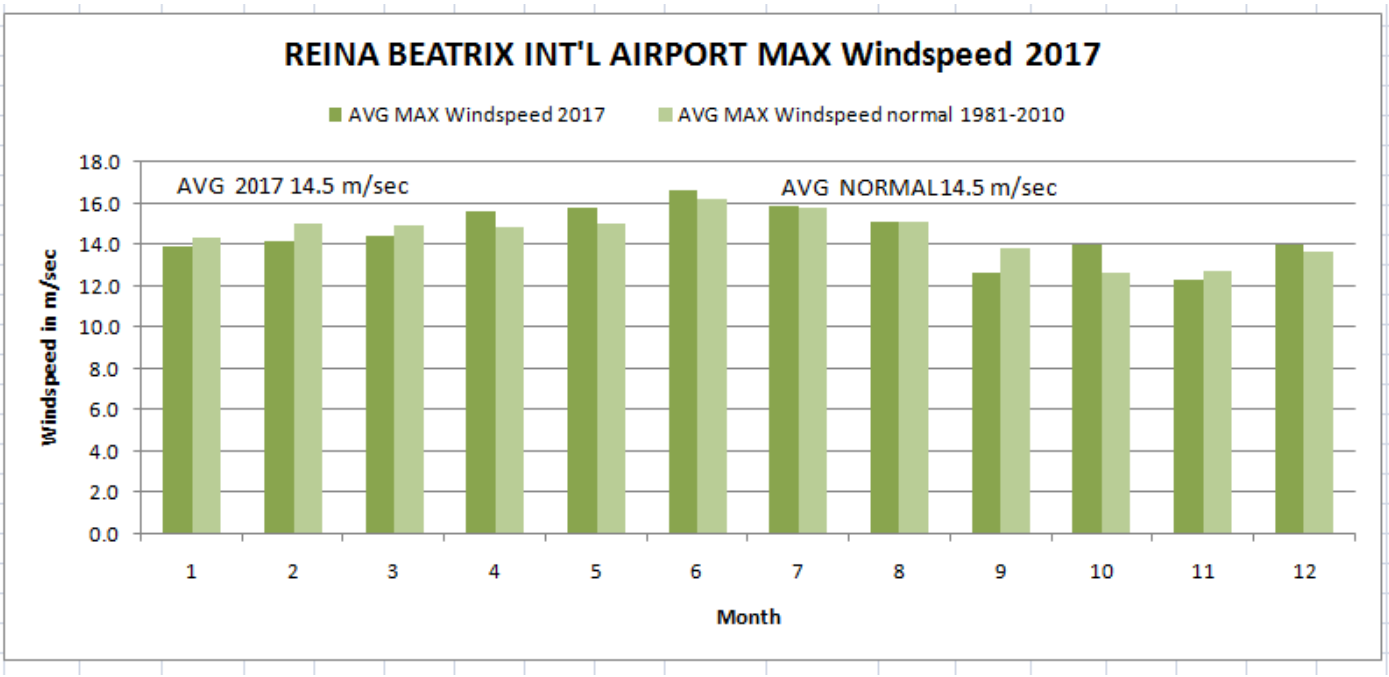


**Figure 3b. Maximum wind-speed 2017 in m/sec.**

The wind-rose figure indicates that for **91.8** % of the time the wind was between 11-17 knots. The wind was **8.2** % of the time between7-11 knots (Figure 3c).

The wind was **91.8** % of the time from the East and **8.2**% from the East-Southeast.

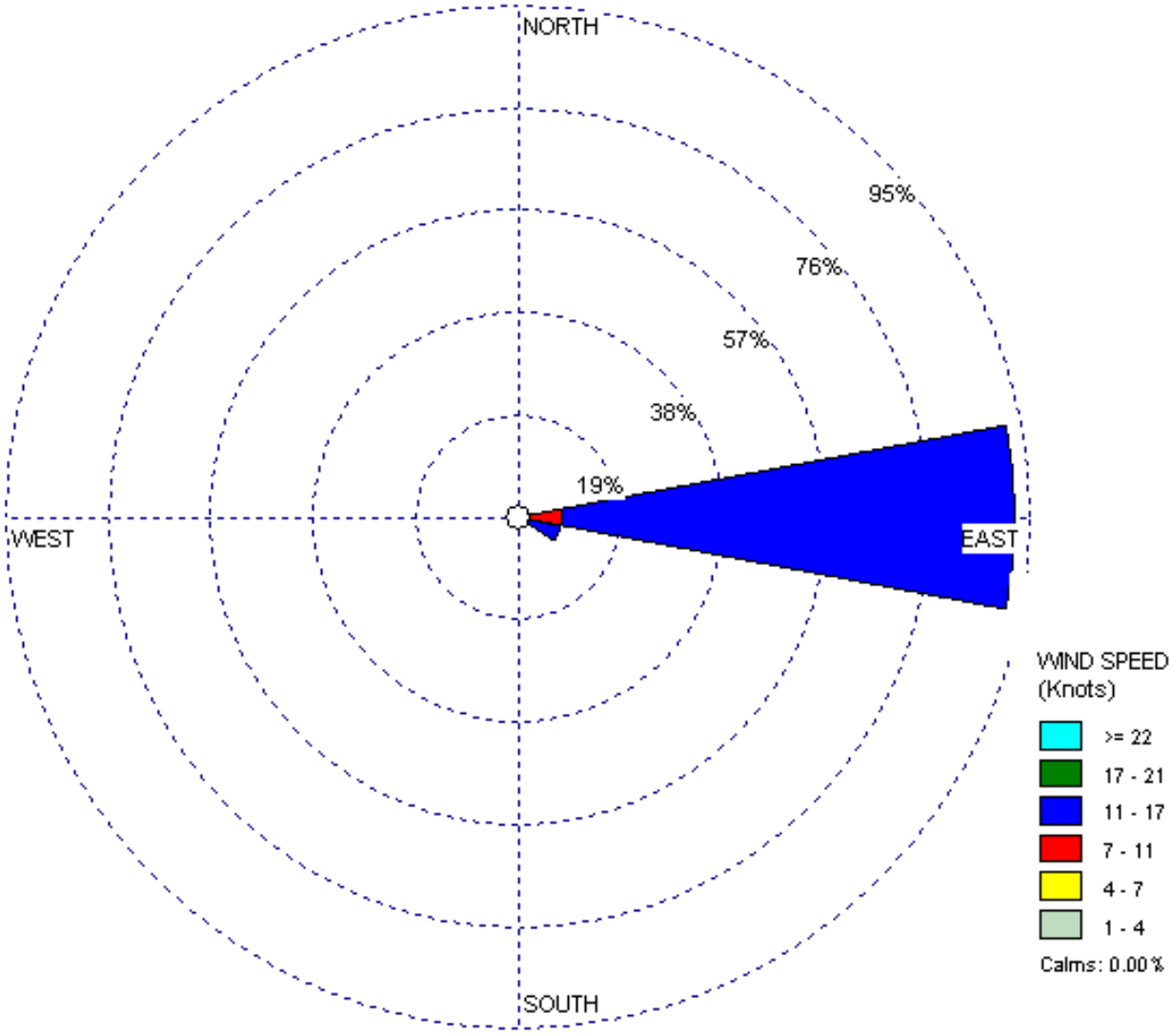


**Figure 3c. Wind-rose data 2017 in knots.**

## ATMOSPHERIC PRESSURE

The average atmospheric pressure for 2017 recorded at the Reina Beatrix International Airport was **1011.8** hPa compared with the normal value of **1011.8** hPa which is around normal (Figure 4).

The *highest* monthly average atmospheric pressure of **1013.6** hPa was recorded during January 2017 with the *lowest* during November 2017 of **1009.5** hPa.

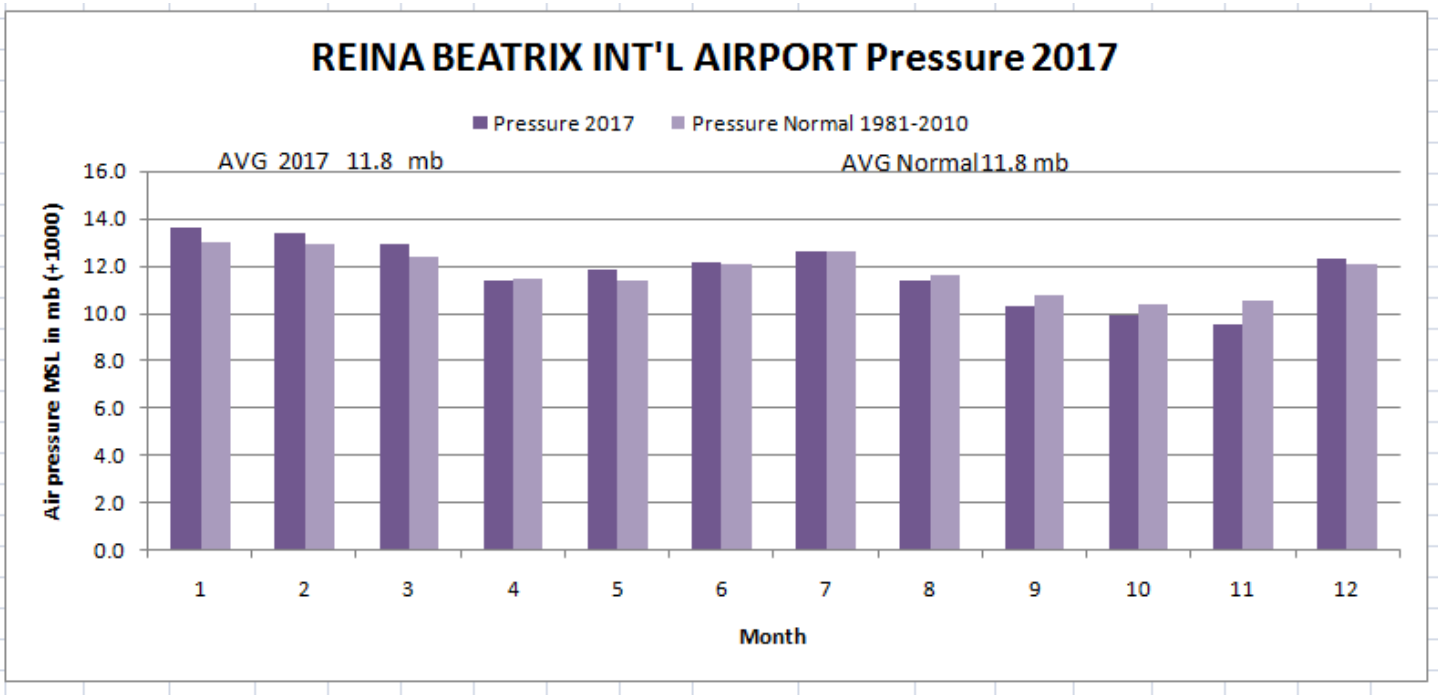


**Figure 4. Atmospheric Pressure at MSL, (Mean Sea Level) in hPa (+1000) 2017.**

## CLOUD COVERAGE

The average cloud coverage in 2017 was **61.2** % compared with the normal value of **47.3** % which is a tab above normal. (Figure 5).

*Highest* average cloud coverage in 2017 was observed during May (**69.9** %) with the *lowest* during the month of February (**46.3** %).

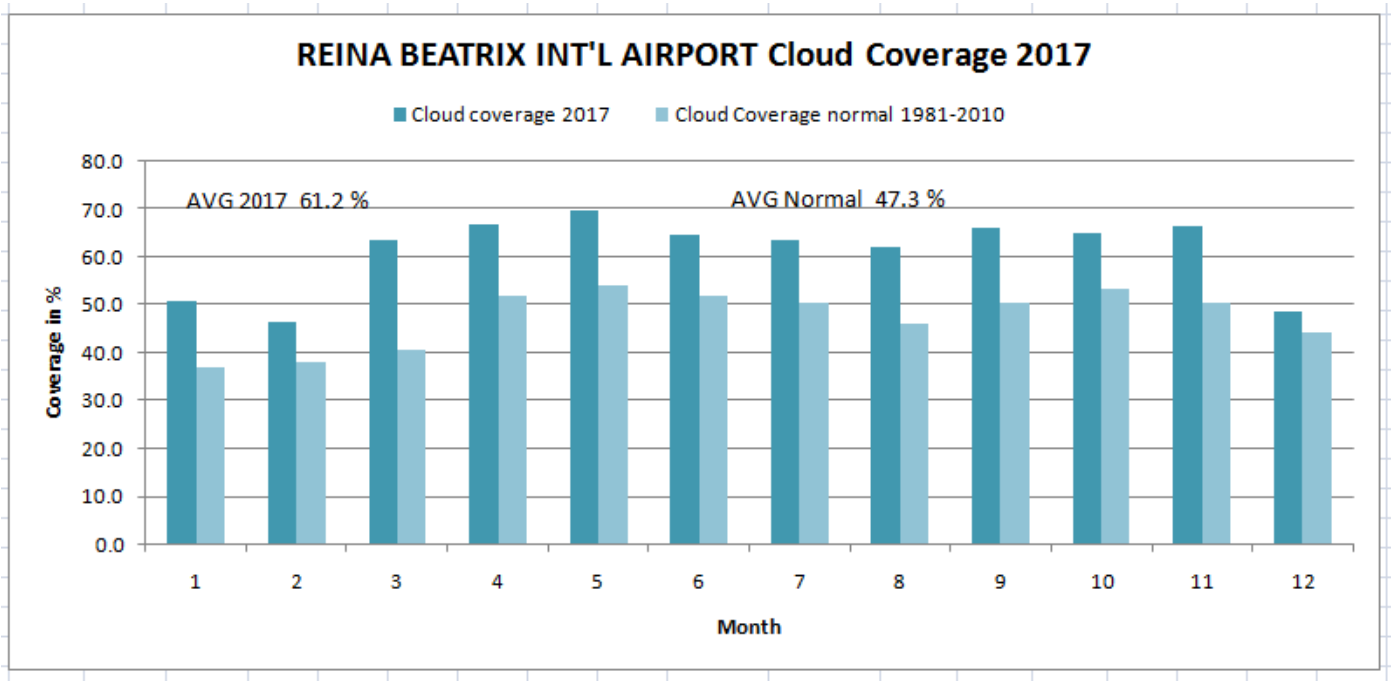


**Figure 5. Total cloud cover in percentage 2017.**

**RELATIVE HUMIDITY**

The average relative humidity of 2017 was **76.2** % compared to the normal value of **77.4**%, which is a tab below normal. (Figure 6). The months of February and July were exceptionally dry compared to the climate normal.

*Highest* monthly average relative humidity of **78.8** % was recorded during the November 2017 with a *lowest* monthly average of **73.3 %** during the month of February 2017.

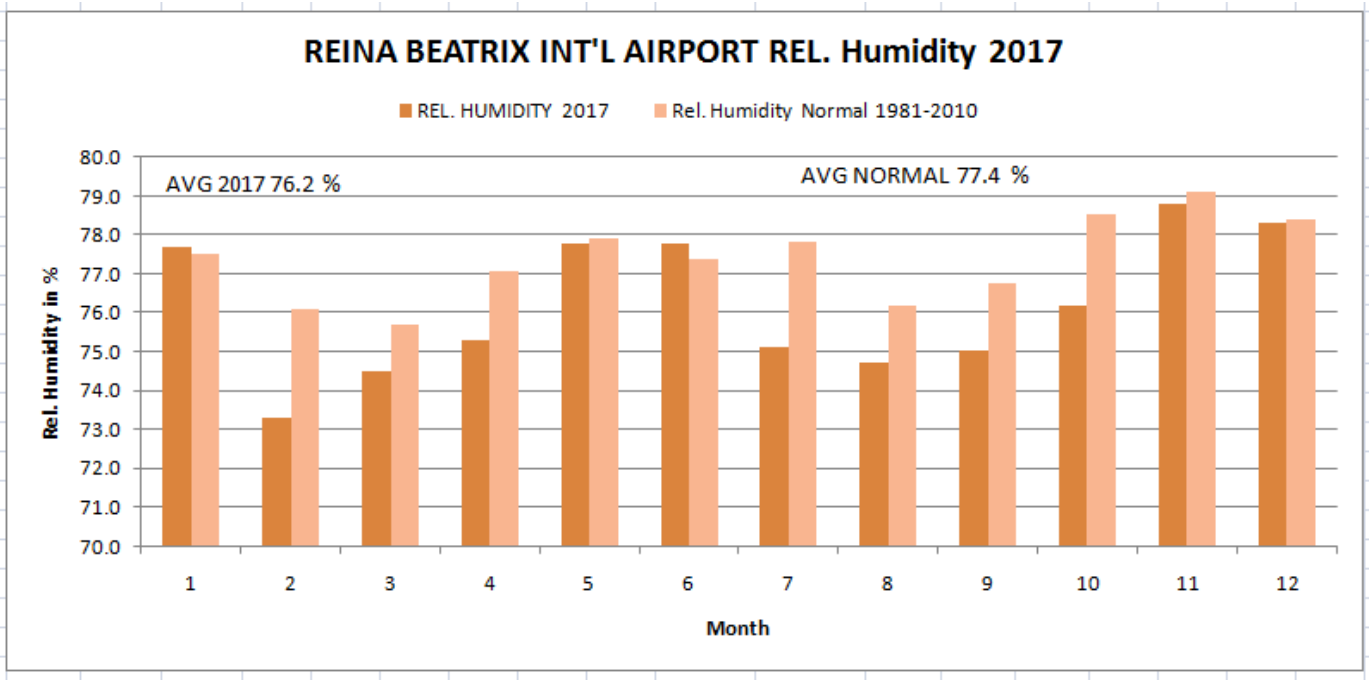


**Figure 6. Relative humidity in percentage 2017.**

**SPECIAL OCCURRENCE (EVENTS) DURING THE YEAR 2017**

**SEISMIC ACTIVITIES:**

There were about 18 earthquake events near Aruba recorded and felt by humans in the year 2017 of which the strongest earthquake was on March 10 2017 at 9:46 AM local time and had a magnitude of 4.7 with epicenter at latitude 12.18 degrees north and longitude 69.67 degrees west, which is about 50 kilometers southwest of Aruba and a depth of 15.9 kilometers.

**EARTHQUAKES NEAR ARUBA YEAR 2017**

| Date | Local Time (AM/PM) | Latitude North (degrees) | Longitude West (degrees) | Magnitude | Depth (km) |
|---|---|---|---|---|---|
| January 31, 2017 | 1:56 AM | 11.72 | 69.23 | 2.7 | 35.5 |
| February 11, 2017 | 8:12 PM | 11.72 | 69.32 | 2.8 | 35.2 |
| February 11, 2017 | 8:19 PM | 11.80 | 69.29 | 3.0 | 51.5 |
| February 24, 2017 | 9:26 PM | 12.04 | 70.71 | 3.1 | 21.4 |
| March 7, 2017 | 1:23 AM | 12.01 | 69.68 | 3.1 | 26.2 |
| March 9, 2017 | 9:29 AM | 12.09 | 69.68 | 4.1 | 21.7 |
| March 10, 2017 | 9:46 AM | 12.18 | 69.67 | 4.7 | 15.9 |
| March 10, 2017 | 10:21 AM | 12.30 | 69.80 | 2.6 | 35.4 |
| March 11, 2017 | 3:29 AM | 12.03 | 69.64 | 3.0 | 15.4 |
| March 13, 2017 | 7:18 AM | 12.39 | 69.47 | 3.4 | 76.4 |
| March 13, 2017 | 5:39 PM | 12.22 | 69.73 | 3.3 | 38.5 |
| March 15, 2017 | 7:48 PM | 12.17 | 69.75 | 2.8 | 22.5 |
| July 23, 2017 | 11:37 AM | 12.07 | 69.94 | 3.9 | 23.0 |
| July 24, 2017 | 7:36 AM | 12.16 | 69.61 | 3.3 | 19.0 |
| July 28, 2017 | 2:56 AM | 12.14 | 69.93 | 2.8 | 61.4 |
| October 26, 2017 | 8:04 AM | 12.18 | 69.68 | 2.9 | 35.8 |
| October 27, 2017 | 8:16 AM | 12.88 | 70.59 | 2.9 | 32.0 |
| November 17, 2017 | 7:55 PM | 12.06 | 69.51 | 2.9 | 39.4 |

**Table 1. Earthquakes near Aruba year 2017.**

**SEVERE BAD WEATHER:**

- **EVENT # 1**

A moderate rain event occurred the 29th to 30th of October when a low level disturbance (trough) moved West in the East to South- Central Caribbean. This feature induced some showery weather over Aruba and at the airport 25mm rainfall was registered.

- **EVENT # 2**

A broad low pressure system in the Central Caribbean Sea caused what we can call a moderate rain event on the 16th to 17th of November 2017.
The system formed by the 13th of November in the South- Central Caribbean and moved slowly Northeast during the next few days, inducing showery weather on it's way. Here in Aruba we registered 43.7 mm rainfall at the airport and 31.4 mm at Seroe Blanco during the period of 16th to 17thof November. Than on the 19th again we got some rainfall of the system as it remained stationary in the North- Central Caribbean before dissipating. On that day it produced 25.8 mm rainfall at the airport, 35.5 mm at Seroe Blanco and 33.1 mm at Ponton.

**CLIMATE ANOMALY:**

Whilst 2017 has been a cooler year than the record-setting 2016, it is very likely to be one of the three warmest years on record, and the warmest not influenced by an El Niño event. The five-year average 2013-2017 global average temperature is currently close to 1°C above the average for 1880-1900 and is likely to be the highest five-year average on record.

Global mean temperature for the period January to September 2017 was 0.47°±0.08°C above the 1981-2010 average. 2017 is on course to be the second or third warmest year on record. The previous year, 2016, which was influenced by a strong El Niño, is likely to remain the warmest at 0.56±0.10°C above the 1981-2010 average. Continuing global warmth means that 2015, 2016 and 2017 are now the three warmest years on record, according to data available to date for 2017.

Over most of the tropical and subtropical Atlantic, temperatures were well above average but not record-breaking. Elevated sea surface temperatures in tropical regions, conducive to coral bleaching, became less widespread during 2017 than they had been during and after the 2015-16 El Niño. Nevertheless, some significant coral bleaching still occurred during 2017.

The El Niño-Southern Oscillation (ENSO) has been in a neutral phase in 2017 to date, with monthly mean sea-surface temperatures in the equatorial central Pacific within 0.5°C of their average values throughout the year.

The North Atlantic has had a very active hurricane season. The Accumulated Cyclone Energy (ACE) index, a measure of the aggregate intensity and duration of cyclones, had its highest monthly value on record in September. The seasonal total ACE as of 18 October is more than double the 1981-2010 average and is already amongst the 10 highest values on record. Three major and high-impact hurricanes occurred in the North Atlantic in rapid succession, with Harvey in August being closely followed by Irma and Maria in September. Harvey made landfall in Texas as a category 4 system, then remained near-stationary near the coast for several days, producing extreme rainfall around and east of the Houston metropolitan area and causing severe flooding. Irma and Maria both reached category 5 intensity. Both were associated with major destruction on a number of Caribbean islands, principally Barbuda, Anguilla, Saint Martin/Sint Maarten, the Virgin Islands and Cuba for Irma, and Dominica and Puerto Rico for Maria. Irma was also associated with significant impacts in Florida, especially its southwest. Later, in mid-October, Ophelia reached major hurricane (category 3) status more than 1,000 kilometers further northeast than any previous North Atlantic hurricane.

**TROPICAL CYCLONE ACTIVITIES:**

Overall activity in the Atlantic basin in 2017 was well above average, with 17 named storms, 10 hurricanes, and 6 major hurricanes. This compares to the long-term averages of 12 named storms, 6 hurricanes, and 3 major hurricanes. One unnamed tropical depression also formed in 2017.

One named storm, Rina, formed in the North Atlantic basin in November. Based on a 30-year climatology (1981-2010), a named storm forms in the basin in roughly 7 out of 10 years in November, with a hurricane forming about once every other year.

In terms of Accumulated Cyclone Energy (ACE), which measures the combined strength and duration of tropical storms and hurricanes, preliminary data indicate that the 2017 season was the most active since 2005 and the 7th most active on record in the basin, behind 1933, 2005, 1893, 1926, 1995, and 2004.

| Name | Dates | Max Wind (mph) |
|---|---|---|
| TS Arlene | 19-21 Apr | 50 |
| TS Bret | 19-20 Jun | 45 |
| TS Cindy | 20-23 Jun | 60 |
| TD Four | 5- 7 Jul | 30 |
| TS Don | 17-18 Jul | 50 |
| TS Emily | 31 Jul- 1 Aug | 45 |
| H Franklin | 6-10 Aug | 85 |
| H Gert | 13-17 Aug | 105 |
| MH Harvey | 17 Aug- 1 Sep | 130 |
| MH Irma | 30 Aug-12 Sep | 185 |
| MH Jose | 5-22 Sep | 155 |
| H Katia | 5- 9 Sep | 105 |
| MH Lee | 15-30 Sep | 115 |
| MH Maria | 16-30 Sep | 175 |
| H Nate | 4- 9 Oct | 90 |
| MH Ophelia | 9-15 Oct | 115 |
| TS Philippe | 28-29 Oct | 60 |
| TS Rina | 6- 9 Nov | 60 |

**Table 2. Hurricanes 2017.**

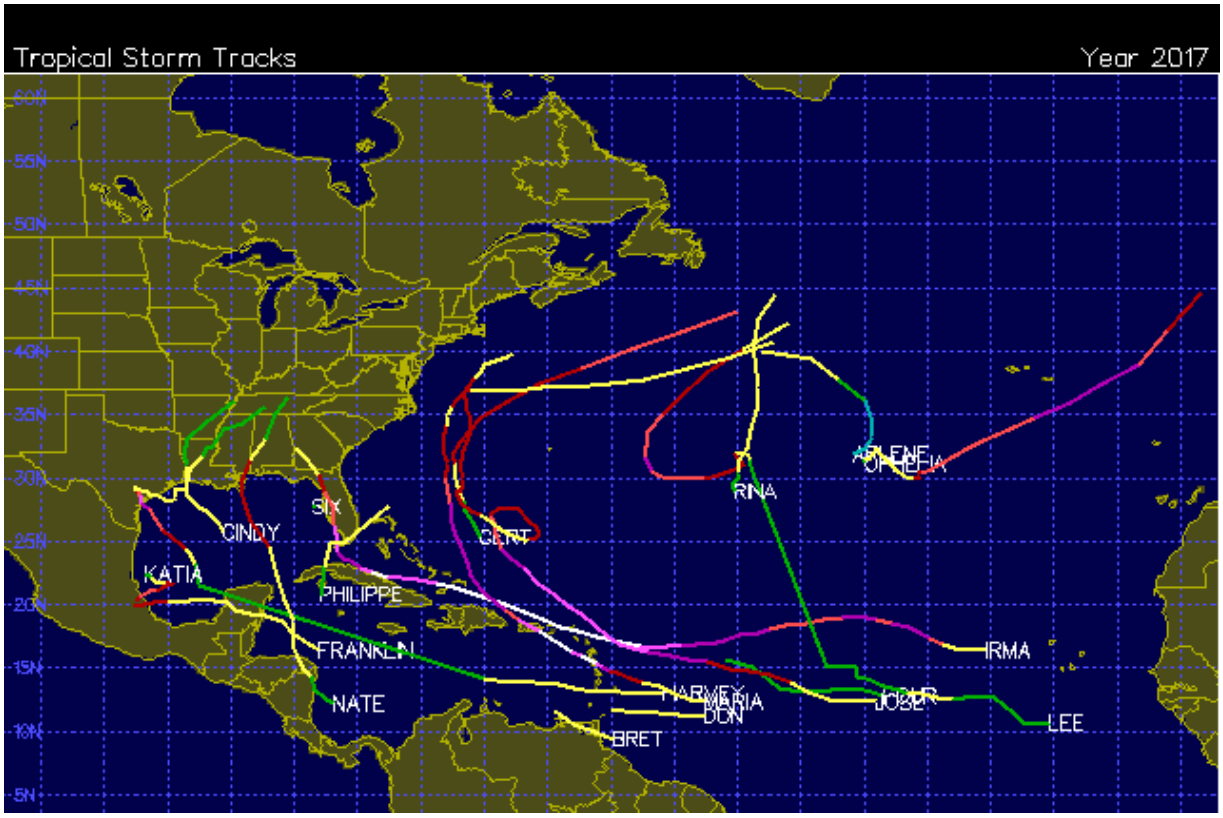


**Figure 10. Storm tracks Atlantic Basin 2017.**

In figure 10 we can see the storm tracks. Major-hurricane Harvey and Tropical Storm Bret were closest to Aruba but were no major threat.

For the year 2018 a slightly above normal hurricane season is forecasted.
Keep in mind that these are extreme long-term forecasts and therefore changes can occur.

Prepared by
Lothar Irausquin.
Researcher
Departamento Meteorologico Aruba

Supervised by :
David Barkmeyer.
Deputy Director
Departamento Meteorologico Aruba